CONTINUOUS EMISSION MONITORING IN KANSAS

The federal Clean Air Act authorizes the U.S. Environmental Protection Agency to establish standards of performance for new sources of air pollution. Standards for various stationary source types have been developed by EPA. These regulations are known as New Source Performance Standards and thus the acronym NSPS. The standards may be amended as new information becomes available regarding a particular source category. They are required to be reviewed every four years by the 1977 amendments to the Act. New Source Performance Standards are codified in Title 40 Part 60 of the Code of Federal Regulations.

The NSPS were developed with the goal of encouraging new and improved control techniques and are thus considered to be "technology forcing". Whole new methodologies of source sampling have been created to develop standards and to determine if the standards are achieved. The General Provisions (Subpart A) of 40 CFR Part 60 delineate the general requirements that sources subject to the regulations must comply with. Section 60.8 deals with performance tests. Section 60.13 outlines monitoring requirements. NSPS is not only concerned with achieving standards, but also with continuous compliance with the standards. Each source category is subject to a particular subpart of NSPS, and the specific requirements of testing and monitoring are contained in that subpart. The testing and monitoring requirements will differ according to the nature of the source. In some cases monitoring will only consist of recordkeeping of process rate or throughput. In source categories that EPA considers it to be economically reasonable and technologically feasible, continuous emission monitoring (CEM) of various pollutants is required by the NSPS. Coal-fired power plants (Subpart D) are an example of a source category that requires a continuous emission monitoring system (CEMS).

The State of Kansas, through its Department of Health and Environment (KDHE), has been delegated the authority to enforce NSPS, as specified in 40 CFR 60.4, subsection (b), paragraph (R). EPA retains the right to enforce the provisions of NSPS, and will do so at the request of KDHE, or if EPA perceives that NSPS is not being properly applied.

In addition to the NSPS regulations, KDHE promulgated a regulation that required continuous emission monitoring of existing coal-fired steam generators greater than 250 million BTU heat input and fluidized-bed catalytic cracking unit (FCC) catalyst regenerators. This regulation, K.A.R. 29-19-19, required those units in the State (not already subject to NSPS) to install certain CEM equipment.

The pollutants that are generally required to be continuously monitored are the criteria pollutants: total suspended particulate matter (TSP), nitrogen oxides (NOx), sulfur dioxide (SO2) ,and carbon monoxide (CO). Volatile organic compounds (VOC) sources are generally monitored by a periodic "leak check", process throughput, or other means. Particulates are monitored through measurement of the opacity in a stack. Opacity is defined as the attenuation of light by a plume. Essentially, the denser (or more opaque) an emission, the higher the opacity. An opacity monitor is basically a light source that shoots a beam across a stack to a sensor. The more light "blocked" from the sensor, the greater the opacity. The output from the opacity monitor is converted to an

electrical signal that is directed to an instantaneous readout somewhere in the plant, usually a control room. Since opacity is regulated over 6-minute averaging times, a strip chart recorder is commonly used for a record of the opacity of a source at any given time. NSPS requires keeping these records for at least two years and in a form that is suitable for inspection. The performance specifications for opacity monitors are well defined in Appendix B of Part 60 (Performance Specification 1). The performance test methods constitute Appendix A. Methods to determine the accuracy of continuous emission monitors are contained in Appendix F: Quality Assurance Procedures. Relative Accuracy Test Audits (RATA), Calibration Gas Audits (CGA), Relative Accuracy Audits (RAA), and other means of assuring accurate and reliable data from gaseous CEMS are defined in Appendix F.

The gaseous pollutants are monitored by directly sampling stack gas or passing a portion of that gas stream through an analyzer of some sort. Carbon monoxide is monitored by means of a nondispersive infrared type analyzer (NDIR). Sulfur dioxide may be monitored by NDIR, ultraviolet (UV), or a fluorescence type analyzer. Nitrogen oxides are generally monitored using a chemiluminescent analyzer. Again, the concentrations of the pollutants in the stack gas are converted to an electrical signal that is sent to an instrument and recording system in a control room. Today, these systems are sometimes computerized to such an extent that the system can generate reports for the source. The system may have alarms that alert the source operator to an occurence of excess emissions. The gaseous pollutants are usually regulated in terms of concentration in the stack gas. Subpart D, Da, and Db sources are limited to so many pounds of sulfur dioxide and nitrous oxides per million BTU of heat input to the boiler. Therefore, a source must convert the parts per million monitored in the stack and relate it to the amount of fuel (of known heating value) consumed over a period of time. Some combustion sources are aso required to monitor a diluent gas, oxygen or carbon dioxide. Hydrogen sulfide is a sulfur dioxide source when it is combusted. It is always present in refinery gas, but it can be removed by an amine treatment process known as "sweetening". NSPS requires subject sources to reduce the hydrogen sulfide content in their refinery gas to a certain level. Continuous monitoring of the hydrogen sulfide content in refinery gas, or the SO2 formed, will probably be required in the future.

The purpose of all this work is simple: to determine whether a source is in compliance with its emission limits all the time it is operating. To achieve that goal, section 60.7 of the NSPS regulations requires the source to submit a report of excess emissions, commonly known as an EER. Excess emission reports are usually required on a quarterly basis, but under some subparts they are required semi-annually. Copies of the EER are sent to EPA Region 7 in Kansas City and to KDHE. According to the State-EPA Agreement (SEA), KDHE has primacy in reviewing these EERs. Staff of KDHE's Bureau of Air and Waste Management (BAWM) review the EER.

Certain criteria must be met for the EER to be acceptable. If emissions exceed the permitted limit for more than two percent of the total source operating time for two or more consecutive quarters, the source is notified that this level of exceedance is not acceptable. This action may also be taken if the excess emission period is more than five percent in any one quarter. Startup and shutdown periods may be excluded from these totals. KDHE may also initiate

enforcement action if the reasons for excess emissions or the corrective actions taken are, in KDHE's opinion, inadequate. If a continuous emission monitor is inoperative for more than five percent of total source operating time in any quarter, the source will be notified that monitor downtime is above an acceptable level. If conditions persist for more than one quarter, KDHE may require an alternative method or backup monitor to achieve compliance. Every instance of noncompliance with these guidelines will be reviewed on a case-by-case basis to ensure that the rules are not applied capriciously or arbitrarily. The EER must identify the problems resulting in excess emissions and measures taken to correct the problems. Any monitor malfunctions and actions taken to correct these problems must also be included in the report. Inadequacies in any of these areas may also be grounds for enforcement action. In summary, the EER is an efficient tool, allowing maximum results in compliance determination in a minimum of time. The CEM program, in general, is a powerful method of achieving emission standards on a full-time basis.

A list of the CEM sources that are currently operating in Kansas is attached. The permit number is the identification number for a source in the CEM Subset of the U.S. EPA's Compliance Data System (CDS). The point number refers to a specific piece of equipment and the channel number specifies a monitor or pollutant. CDS resides on a main-frame computer at EPA's National Computer Center. BAWM staff access this system via personal computer and modem. Information such as monitor type, manufacturer, certification, performance specifications, and other data are contained in the CEM Subset. Reduced data from the EERs is used to update the system and provide EPA and KDHE a means of tracking these sources and establishing a compliance history. The system can also be used for generating various reports. CDS is to be consolidated into a new database system called AIRS in the near future. AIRS is the acronym for Aerometric Information and Retrieval System. Emission and compliance information will be combined in this system.

Increased continuous emission monitoring is probably the trend of the future. Systems that are increasingly more accurate and reliable are being developed by the manufacturers. The public is becoming more aware of and concerned about air pollution problems. Congress is wrestling with reenactment of the Clean Air Act. There will probably be a call for reduced emissions of the "acid rain" gases, SO2 and NOx. Some air pollution control agencies in the country already have instantaneous access to CEM readouts of some sources via telemetry. Who knows? Someday continuous emission monitoring may take place at the offices of the regulatory agency!

CEM SOURCES IN KANSAS
JULY 1989

COUNTY CODE	PERMIT NUMBER	PLANT NAME	APPL REG.	POINT NO.	POINT DESCRIPTION	CHANNEL NO.	POLLUTANT
0340	90004	TEXACO-EL DORADO	NSPS	0001	BOILER B-107	199	TSP-OPACITY
0340	90004	TEXACO-ELDORADO	NSPS	0001	BOILER B-107	299	SO2
0340	90004	TEXACO-EL DORADO	NSPS	0005	BOILER B-108	199	TSP-OPACITY
0340	90004	TEXACO-EL DORADO	NSPS	0005	BOILER B-108	299	SO2
0340	00004	TEXACO-EL DORADO	SIP	0001	FCC UNIT	199	TSP/OPACITY
1060	90023	SUNFLOWER-HOLCOMB	NSPS	0001	UNIT 1	199	TSP/OPACITY
1060	90023	SUNFLOWER-HOLCOMB	NSPS	0001	UNIT 1	299	SO2
1060	90023	SUNFLOWER-HOLCOMB	NSPS	0001	UNIT 1	399	NOX
1060	90023	SUNFLOWER-HOLCOMB	NSPS	0001	UNIT 1	499	CO
2100	90005	KCPL-LA CYGNE	NSPS	0010	BOILER 2	199	TSP/OPACITY
2100	90005	KCPL-LA CYGNE	NSPS	0010	BOILER 2	299	SO2
2440	90003	FARMLAND IND-COFFEYVILLE	NSPS	0006	COAL FIRED BOIL	199	TSP/OPACITY
2440	90003	FARMLAND IND-COFFEYVILLE	NSPS	0006	COAL FIRED BOIL	299	SO2
2440	90003	FARMLAND IND-COFFEYVILLE	NSPS	0016	FCC UNIT	199	TSP/OPACITY
2880	90001	FARMLAND IND-PHILLIPSBURG	NSPS	0002	PROCESS HEATER	299	SO2
2960	90001	KPL-JEFFREY	NSPS	0001	UNIT 1	199	TSP/OPACITY
2960	90001	KPL-JEFFREY	NSPS	0001	UNIT 1	299	SO2
2960	90001	KPL-JEFFREY	NSPS	0001	UNIT 1	399	NOX
2960	90001	KPL-JEFFREY	NSPS	0001	UNIT 1	499	CO
2960	90001	KPL-JEFFREY	NSPS	0002	UNIT 2	199	TSP/OPACITY
2960	90001	KPL-JEFFREY	NSPS	0002	UNIT 2	299	SO2
2960	90001	KPL-JEFFREY	NSPS	0002	UNIT 2	399	NOX
2960	90001	KPL-JEFFREY	NSPS	0002	UNIT 2	499	CO
2960	90001	KPL-JEFFREY	NSPS	0003	UNIT 3	199	TSP/OPACITY
2960	90001	KPL-JEFFREY	NSPS	0003	UNIT 3	299	SO2
2960	90001	KPL-JEFFREY	NSPS	0003	UNIT 3	399	NOX
2960	90001	KPL-JEFFREY	NSPS	0003	UNIT 3	499	CO
3840	00048	BPU-QUINDARO	SIP	0001	BOILER 21	199	TSP/OPACITY
3840	00048	BPU/QUINDARO	SIP	0002	BOILER 22	199	TSP/OPACITY
3840	00049	BPU/KAW	SIP	0001	BOILER K1	199	TSP/ OPACITY
3840	00049	BPU/KAW	SIP	0002	BOILER K2	199	TSP/OPACITY
3840	90008	BPU-NEARMAN	NSPS	0001	UNIT 1	199	TSP/OPACITY
3840	90008	BPU/NEARMAN	NSPS	0001	UNIT 1	299	SO2
3840	90008	BPU/NEARMAN	NSPS	0001	UNIT 1	399	NOX
0860	00014	KPL GAS-LAWRENCE	SIP	0003	UNIT 4	999	COAL SAMP/SO
0860	00014	KPL GAS-LAWRENCE	SIP	0004	UNIT 5	999	COAL SAM/SO2
2100	00005	KCPL-LA CYGNE	SIP	0001	UNIT 1	299	SO2
0440	00002	EMPIRE	SIP	0001	BOILER 39	199	OPACITY
0440	00002	EMPIRE	SIP	0002	BOILER 40	199	OPACITY
3320	90020	DERBY REFINERY-WICHITA	NSPS	0001	FCC UNIT	199	OPACITY